...first complete microprocessor system for students, engineers, and scientists.
The electronic revolution of the 50's and 60's provided us with the computer, the amazing tool that performs such complex tasks business and industry could not wholly function without it.

The revolution continues!

The latest advance is in tiny computers called microprocessors. They are opening up great new technological areas which will touch on the lives of each one of us.

Microprocessors are already used in banks for contact with remote computers, at store check-out counters where scanners read code lines on merchandise for pricing and inventory control, in the sciences for interfacing experiments with computers, and in industry for designing electronic circuits to automate production lines.

But the future of microprocessing has hardly been tapped. We can look forward to the day when microprocessors in our homes will control heating, lighting, and security devices, order groceries, and aid our youngsters with homework. A unit in our automobile will alert us to mechanical problems, driving dangers, and perhaps even take over some of the driving. In certain businesses, employees will never have to go to the office, but handle their work at a microprocessor keyboard in their homes.

Knowledgeable people believe microprocessing will create another revolution in electronic technology.

THE E&L MICROPROCESSOR SYSTEM — THE MICRO-DESIGNER

The Micro-Designer is for both the individual who wants to learn digital electronics and for the one who is trained in electronics and wants to use the microprocessor in his work. It is so versatile a system that the same equipment used by the student can be used by the Design Engineer in instrument or system design.

The Micro-Designer is the first complete microprocessor system to include hardware, software, and educational materials. It is also the only complete microprocessor test and development system with solderless breadboarding capabilities and software support. While other systems may provide hardware, software and some instructions, the E&L system goes far beyond that to take the individual step by step from basic digital electronics to interfacing and independent system design.

WHERE THEY ARE USED

For teaching digital electronics

Microprocessors are used in universities, two year community colleges, vocational high schools, private schools, and in armed forces technical schools to provide digital electronics training.

The E&L educational system introduces the student immediately to digital electronic devices and circuits and provides him with the freedom to set up and analyze experiments demonstrating principles, concepts and applications.

The student is provided with an extensive series of experiments that will give him a solid understanding of the principles of microprocessing and the ability to build and test his own systems.

For In-House Training

As microprocessing becomes more and more a part of business and industrial operations, many individuals will be called on by employers to take over responsibilities in this new field. These people will often have some knowledge of electronics, but will need a refresher course to bring them up to date. Continuing education on an E&L Micro-Designer enables the employee to proceed to designing systems for his company.

E&L offers a training Seminar Program for those companies who are interested. Details are on pg. 3.

For Self-Training

For the engineer, scientist, or technical person who sees the future in microprocessing and wants to enter the technology, whether or not he has had electronics training, the Micro-Designer provides a method for self-training. The instructional materials allow a participant to proceed at his own speed to the point where he can develop systems and interfaces for practical use.

For Design Engineers

With the exception of schools, perhaps no other field makes greater use of microprocessors than companies already using or desiring to incorporate computers in their operations.

With an E&L Micro-Designer System available, an engineer can design and test whatever system he desires. It offers him the opportunity to try a breadboard design that he cannot possibly experiment with in his production system. When he is ready to make a final or OEM type system, he can use the same modules and cards he experimented with.
And his experimenting is not limited to the materials supplied with the MD-1 package. A broad range of accessories, modules and Outboards® are available from E&L for building more sophisticated circuits.

**VERSATILE**

Because of its compact packaging, and since it can be plugged into any 110V or 220V AC source, the Micro-Designer can be used in laboratories, offices, libraries, schools, homes, and factories. The only tools needed to complete the experiments are pliers, screwdrivers, and a wire cutter/stripper.

**BUGBOOKS I—IV**

The BUGBOOKS are one of the unique parts of the E&L Micro-Designer System approach that make it different from other systems. There are five BUGBOOKS in the E&L package, each one presenting step-by-step instructions for completing experiments or circuits. They lead from the simple circuits for learning, to complex and sophisticated interfacing problems.

**BUGBOOKS I & II**

Logic and Memory Experiments Using TTL Integrated Circuits.

These two books are for those people who have no knowledge of or who need a refresher course in digital electronics. Presentation is in a simple and interesting fashion, highlighted by 90 logic and memory experiments that teach the basics and lead to interfacing a circuit design with a computer.

**BUGBOOK III**

Interfacing and Scientific Data Communications Experiments Using The Universal Asynchronous Receiver Transmitter (UART) and 20 mA Current Loops

Provides self-instructional experiments on interfacing to microprocessors, teletypes, and CRT terminals.

**BUGBOOK IV**

Microcomputer and Interfacing Experiments Using the MD-1 Micro-Designer, an 8080 System.

This is the first text written in a self-teaching style with experiments that thoroughly explore how to use, interface and program microcomputers. The text/experiments are available for formal classroom use or for use by an individual without additional assistance. The experiments are written for use with the MD-1 microcomputer, a system based on the popular and readily available INTEL 8080 microprocessor. Bugbook III is available now in stock at all of our local representatives (see attached list) at an introductory price of $14.95 each.

**SEMINARS**

E&L will conduct a standard Seminar Program as well as “in-house” courses for companies desiring to train selected employees in all phases of digital electronics and microprocessors. Retraining programs are also available. Professional instructors take the student through a step-by-step program involving “hands-on” experiments with hardware and software. Classes are kept small to provide for close supervision and personal attention.

Seminars can be arranged by checking the proper space on the attached mailing card.

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I'm Interested!
Please rush me more information on your Micro-Designer system.

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Send technical literature on other E&L hardware and Outboards®.

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Have a salesman call.

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I'm interested in the Seminar Program. Send me more information.

Name

Company/School

Address

City _____________________ State & Zip _____________________

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Telephone _____________________

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Title _____________________
The E&L Micro-Designer System hardware package. Technical details on the parts and available Outboards® are described in separate literature. Check off appropriate box on attached mailing card for full specifications.

Front Panel
Controls and monitors functions of microprocessor. Allows data input and output without need for tele typewriter. Provides for data input and display, status signals, interrupts and single step of programs.

Central Processing Card
Heart of the microprocessor. Uses the Intel 8080 microprocessor "chip" and contains all the necessary signal buffering, gating and clocking functions.

Interface Board
All elements plug into this motherboard which provides signal and power buses and two SK-1 D's for solderless interface circuit breadboarding.

Memory Card
Contains up to 3K of static read/write memory and up to 1K of UV erasable PROMs.

HARDWARE & SOFTWARE ACCESSORIES
Asynchronous Card
Allows the microprocessor system to operate with terminals and modems using EIA or 20MA loops. All cards are standard "DEC" size.

Many necessary hardware peripherals and software development aids are or will be available: additional memory, interfacing outboards, assembler, software monitor, breakpoint and debugging programs.

E&L Instruments, Inc.
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